

FIGURE 1

Staphylothermus marinus - F1-12LC

ATG TCT TTA AAC AAG CAC TCT TGG ATG GAT ATG ATA ATA TTT ATT CTC
 Met Ser Leu Asn Lys His Ser Trp Met Asp Met Ile Ile Phe Ile Leu
 AGC TTT TCT TTC CCA TTA ACA ATG ATC GCA TTA GCT ATC TCT ATG TCG
 Ser Phe Ser Phe Pro Leu Thr Met Ile Ala Leu Ala Ile Ser Met Ser
 TCA TGG TTT AAT ATA TGG AAT AAT GCA TTA AGC GAT CTA GGA CAT GCT
 Ser Trp Phe Asn Ile Trp Asn Asn Ala Leu Ser Asp Leu Gly His Ala
 GTT AAA AGC AGT GTT GCT CCA ATA TTC AAT CTA GGT CTT GCA ATT GGT
 Val Lys Ser Ser Val Ala Pro Ile Phe Asn Leu Gly Leu Ala Ile Gly
 GGG ATA CTA ATT GTT ATA GTT GGT TTA AGA AAT CTT TAT TCG TGG AGT
 Gly Ile Leu Ile Val Ile Val Gly Leu Arg Asn Leu Tyr Ser Trp Ser
 AGA GTT AAA GGA TCT TTA ATC ATA TCC ATG GGT GTA TTT CTT AAC TTA
 Arg Val Lys Gly Ser Leu Ile Ile Ser Met Gly Val Phe Leu Asn Leu
 ATA GGG GTT TTC GAC GAA GTA TAT GGT TGG ATA CAT TTC CTA GTC TCA
 Ile Gly Val Phe Asp Glu Val Tyr Gly Trp Ile His Phe Leu Val Ser
 GTA TTG TTT TTC TTA TCA ATA ATA GCA TAT TTC ATA GCT ATA TCA ATA
 Val Leu Phe Phe Leu Ser Ile Ile Ala Tyr Phe Ile Ala Ile Ser Ile
 CTT GAC AAA TCA TGG ATA GCT GTT CTA CTA ATA ATA GGT CAT ATT GCA
 Leu Asp Lys Ser Trp Ile Ala Val Leu Leu Ile Ile Gly His Ile Ala
 ATG TGG TAT CTA CAC TTT GCT TCA GAG ATT CCG AGA GGT GCG GCT ATT
 Met Trp Tyr Leu His Phe Ala Ser Glu Ile Pro Arg Gly Ala Ala Ile
 CCC GAG TTA TTA GCG GTA TTC TCG TTT TTA CCA TTC TAT ATA AGA GAC
 Pro Glu Leu Leu Ala Val Phe Ser Phe Leu Pro Phe Tyr Ile Arg Asp
 TAT TTT AAA TCA TAC ACT AAA CGA TAG
 Tyr Phe Lys Ser Tyr Thr Lys Arg

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Pyrodictium - TAG11-17LC

ATG Met	AAA Lys	CTC Leu	CTT Leu	GAG Glu	CCC Pro	ACA Thr	AAT Asn	ACC Thr	TCC Ser	TAC Tyr	ACG Thr	CTG Leu	TTA Leu	CAG Gln	GAT Asp
TTA Leu	GCA Ala	TTG Leu	CAT His	TTT Phe	GCA Ala	TTT Phe	TAC Tyr	TGG Trp	TTT Phe	CTG Leu	GCC Ala	GTG Val	TAT Tyr	ACG Thr	TGG Trp
TTA Leu	CCC Pro	GGT Gly	GTC Val	CTA Leu	GTC Val	CGG Arg	GGC Gly	GTA Val	GCT Ala	GTG Val	GAC Asp	ACA Thr	GGG Gly	GTG Val	GCT Ala
CGG Arg	GTG Val	CCT Pro	GGG Gly	CTC Leu	GGC Gly	CGG Arg	CGC Arg	GGT Gly	AAG Lys	AGG Arg	CTG Leu	CTC Leu	CTG Leu	GCC Ala	GCT Ala
GTG Val	GCT Ala	GTC Val	TTG Leu	GCG Ala	CTT Leu	GTT Val	GTG Val	TCC Ser	GTT Val	GTT Val	GTC Val	CCG Pro	GCT Ala	TAT Tyr	GTG Val
GCG Ala	TAT Tyr	AGT Ser	AGT Ser	CTG Leu	CAC His	CCG Pro	GAG Glu	AGC Ser	TGT Cys	CGG Arg	CCC Pro	GTT Val	GCG Ala	CCG Pro	GAG Glu
GGG Gly	CTC Leu	ACC Thr	TAC Tyr	AAA Lys	GAG Glu	TTC Phe	AGC Ser	GTG Val	ACC Thr	GCG Ala	GAG Glu	GAT Asp	GGC Gly	TTG Leu	GTG Val
GTT Val	CGG Arg	GGC Gly	TGG Trp	GTG Val	CTG Leu	GGC Gly	CCC Pro	GGC Gly	GCT Ala	GGG Gly	GGC Gly	AAC Asn	CCG Pro	GTG Val	TTC Phe
GTT Val	TTG Leu	ATG Met	CAC His	GGG Gly	TAT Tyr	ACT Thr	GGG Gly	TGC Cys	CGC Arg	TCG Ser	GCG Ala	CCC Pro	TAC Tyr	ATG Met	GCT Ala
GTG Val	CTG Leu	GCC Ala	CGG Arg	GAG Glu	CTC Leu	GTG Val	GAG Glu	TGG Trp	GGG Gly	TAC Tyr	CCG Pro	GTG Val	GTT Val	GTG Val	TTC Phe
GAC Asp	TTC Phe	CGG Arg	GGC Gly	CAC His	GGG Gly	GAG Glu	AGC Ser	GGG Gly	GGC Gly	TCG Ser	ACG Thr	ACG Thr	ATT Ile	GGG Gly	CCC Pro
CGG Arg	GAG Glu	GTG Val	CTG Leu	GAT Asp	GCC Ala	CGG Arg	GCT Ala	GTG Val	GTG Val	GGC Gly	TAT Tyr	GTC Val	TCG Ser	GAG Glu	CGG Arg
TTC Phe	CCC Pro	GGC Gly	CGC Arg	CGG Arg	ATA Ile	ATA Ile	TTG Leu	GTG Val	GGG Gly	TTC Phe	AGT Ser	ATG Met	GGC Gly	GGC Gly	GCT Ala
GTA Val	GCG Ala	ATC Ile	GTG Val	GAG Glu	GGT Gly	GCT Ala	GGG Gly	GAC Asp	CCG Pro	CGG Arg	GTC Val	TAC Tyr	GCG Ala	GTG Val	GCT Ala
GCT Ala	GAT Asp	AGC Ser	CCG Pro	TAC Tyr	TAT Tyr	AGG Arg	CTC Leu	CGG Arg	GAC Asp	GTC Val	ATA Ile	CCC Pro	CGG Arg	TGG Trp	CTG Leu
GAG	TAC	AAG	ACG	CCG	CTG	CCG	GGC	TGG	GTG	GGT	GTG	CTG	GCC	GGG	TTC

Aquifex pyrophilus - 28LC

TTG Leu	AGA Arg	TTG Leu	AGG Arg	AAA Lys	TTT Phe	GAA Glu	GAG Glu	ATA Ile	AAC Asn	CTC Leu	GTT Val	CTT Leu	TCG Ser	GGA Gly	GGA Gly
GCT Ala	GCA Ala	AAG Lys	GGC Gly	ATA Ile	GCC Ala	CAC His	ATA Ile	GGT Gly	GTT Val	TTG Leu	AAA Lys	GCT Ala	ATA Ile	AAC Asn	GAG Glu
CTC Leu	GGT Gly	ATA Ile	AGG Arg	GTG Val	AGG Arg	GCT Ala	TTA Leu	AGC Ser	GGG Gly	GTG Val	AGC Ser	GCC Ala	GGG Gly	GCA Ala	ATC Ile
GTT Val	TCG Ser	GTC Val	TTT Phe	TAT Tyr	GCC Ala	TCA Ser	GGC Gly	TAC Tyr	TCC Ser	CCT Pro	GAA Glu	GGG Gly	ATG Met	TTC Phe	AGC Ser
CTT Leu	CTG Leu	AAG Lys	AGG Arg	GTA Val	AAC Asn	TGG Trp	CTG Leu	AAG Lys	CTG Leu	TTT Phe	AAG Lys	TTC Phe	AAG Lys	CCA Pro	CCT Pro
CTG Leu	AAG Lys	GGA Gly	TTG Leu	ATA Ile	GGG Gly	TGG Trp	GAG Glu	AAG Lys	GCT Ala	ATA Ile	AGA Arg	TTC Phe	CTT Leu	GAG Glu	GAA Glu
GTT Val	CTC Leu	CCT Pro	TAC Tyr	AGG Arg	AGA Arg	ATA Ile	GAA Glu	AAA Lys	CTT Leu	GAG Glu	ATA Ile	CCG Pro	ACG Thr	TAT Tyr	ATA Ile
TGC Cys	GCG Ala	ACG Thr	GAT Asp	TTA Leu	TAC Tyr	TCG Ser	GGA Gly	AGG Arg	GCT Ala	CTA Leu	TAC Tyr	CTC Leu	TCG Ser	GAA Glu	GGG Gly
AGT Ser	TTA Leu	ATC Ile	CCC Pro	GCA Ala	CTT Leu	CTC Leu	GGC Gly	AGC Ser	TGT Cys	GCA Ala	ATT Ile	CCC Pro	GGC Gly	ATA Ile	TTT Phe
GAA Glu	CCC Pro	GTT Val	GAG Glu	TAT Tyr	AAG Lys	AAT Asn	TAC Tyr	TTG Leu	CTC Leu	GTT Val	GAC Asp	GGA Gly	GGT Gly	ATA Ile	GTT Val
AAC Asn	AAC Asn	CTT Leu	CCC Pro	GTT Val	GAG Glu	CCC Pro	TTT Phe	CAG Gln	GAA Glu	AGC Ser	GGT Gly	ATT Ile	CCC Pro	ACC Thr	GTT Val
TGC Cys	GTT Val	GAT Asp	GTC Val	CTT Leu	CCC Pro	ATA Ile	GAG Glu	CCG Pro	GAA Glu	AAG Lys	GAT Asp	ATA Ile	AAG Lys	AAC Asn	ATT Ile
CTT Leu	CAC His	ATC Ile	CTT Leu	TTG Leu	AGG Arg	AGC Ser	TTC Phe	TTT Phe	CTT Leu	GCG Ala	GTC Val	CGC Arg	TCA Ser	AAC Asn	TCC Ser
GAA Glu	AAG Lys	AGA Arg	AAG Lys	GAG Glu	TTT Phe	TGT Cys	GAC Asp	CTC Leu	GTT Val	ATA Ile	GTT Val	CCT Pro	GAG Glu	CTT Leu	GAG Glu
GAG Glu	TTC Phe	ACA Thr	CCC Pro	CTT Leu	GAT Asp	GTT Val	AGA Arg	AAA Lys	GCG Ala	GAC Asp	CAA Gln	ATA Ile	ATG Met	GAG Glu	AGG Arg

GGA TAC ATA AAG GCC TTA GAG GTA CTT TCT GAA TAG
Gly Tyr Ile Lys Ala Leu Glu Val Leu Ser Glu

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M11TL-29L.

ATG Met	TTT Phe	AAT Asn	ATC Ile	AAT Asn	GTC Val	TTT Phe	GTT Val	AAT Asn	ATA Ile	TCT Ser	TGG Trp	CTG Leu	TAT Tyr	TTT Phe	TCA Ser
GGG Gly	ATA Ile	GTT Val	ATG Met	AAG Lys	ACT Thr	GTG Val	GAA Glu	GAG Glu	TAT Tyr	GCG Ala	CTA Leu	CTT Leu	GAA Glu	ACA Thr	GGC Gly
GTA Val	AGA Arg	GTG Val	TTT Phe	TAT Tyr	CGG Arg	TGT Cys	GTA Val	ATC Ile	CCG Pro	GAG Glu	AAA Lys	GCT Ala	TTT Phe	AAC Asn	ACT Thr
TTG Leu	ATA Ile	ATA Ile	GGT Gly	TCA Ser	CAC His	GGA Gly	TTG Leu	GGG Gly	GCG Ala	CAC His	AGT Ser	GGA Gly	ATC Ile	TAC Tyr	ATT Ile
AGT Ser	GTT Val	GCT Ala	GAA Glu	GAA Glu	TTT Phe	GCT Ala	AGG Arg	CAC His	GGA Gly	TTT Phe	GGA Gly	TTC Phe	TGC Cys	ATG Met	CAC His
GAT Asp	CAA Gln	AGG Arg	GGA Gly	CAT His	GGG Gly	AGA Arg	ACG Thr	GCA Ala	AGC Ser	GAT Asp	AGA Arg	GAA Glu	AGA Arg	GGG Gly	TAT Tyr
GTG Val	GAG Glu	GGC Gly	TTT Phe	CAC His	AAC Asn	TTC Phe	ATA Ile	GAG Glu	GAT Asp	ATG Met	AAG Lys	GCC Ala	TTC Phe	TCC Ser	GAT Asp
TAT Tyr	GCC Ala	AAG Lys	TGG Trp	CGC Arg	GTG Val	GGA Gly	GGT Gly	GAC Asp	GAA Glu	ATA Ile	ATA Ile	TTG Leu	CTA Leu	GGA Gly	CAC His
AGT Ser	ATG Met	GGC Gly	GGG Gly	CTG Leu	ATA Ile	GCG Ala	CTC Leu	TTA Leu	ACA Thr	GTT Val	GCA Ala	ACT Thr	TAT Tyr	AAA Lys	GAA Glu
ATC Ile	GCC Ala	AAG Lys	GGA Gly	GTT Val	ATC Ile	GCG Ala	CTA Leu	GCC Ala	CCG Pro	GCC Ala	CTC Leu	CAA Gln	ATC Ile	CCC Pro	TTA Leu
ACC Thr	CCG Pro	GCT Ala	AGA Arg	AGA Arg	CTT Leu	GTT Val	CTA Leu	AGC Ser	CTC Leu	GCG Ala	TCA Ser	AGG Arg	CTT Leu	GCC Ala	CCG Pro
CAT His	TCT Ser	AAG Lys	ATC Ile	ACC Thr	TTA Leu	CAA Gln	AGG Arg	AGA Arg	TTG Leu	CCG Pro	CAG Gln	AAA Lys	CCA Pro	GAG Glu	GGT Gly
TTT Phe	CAA Gln	AGA Arg	GCA Ala	AAA Lys	GAT Asp	ATA Ile	GAA Glu	TAC Tyr	AGT Ser	CTG Leu	AGT Ser	GAA Glu	ATA Ile	TCA Ser	GTC Val
AAG Lys	CTC Leu	GTG Val	GAC Asp	GAA Glu	ATG Met	ATT Ile	AAA Lys	GCA Ala	TCA Ser	TCT Ser	ATG Met	TTC Phe	TGG Trp	ACC Thr	ATA Ile
GCA Ala	GGG Gly	GAA Glu	ATT Ile	AAT Asn	ACT Thr	CCC Pro	GTC Val	CTG Leu	CTT Leu	ATT Ile	CAT His	GGG Gly	GAA Glu	AAA Lys	GAC Asp

FIGURE 6

Thermococcus CL-2-30LC

ATG	GAG	GTT	TAC	AAG	GCC	AAA	TTC	GGC	GAA	GCA	AAG	CTC	GGC	TGG	GTC
Met	Glu	Val	Tyr	Lys	Ala	Lys	Phe	Gly	Glu	Ala	Lys	Leu	Gly	Trp	Val
GTT	CTG	GTT	CAT	GGC	CTC	GGC	GAG	CAC	AGC	GGA	AGG	TAT	GGA	AGA	CTG
Val	Leu	Val	His	Gly	Leu	Gly	Glu	His	Ser	Gly	Arg	Tyr	Gly	Arg	Leu
ATT	AAG	GAA	CTC	AAC	TAT	GCC	GGC	TTT	GGA	GTT	TAC	ACC	TTC	GAC	TGG
Ile	Lys	Glu	Leu	Asn	Tyr	Ala	Gly	Phe	Gly	Val	Tyr	Thr	Phe	Asp	Trp
CCC	GGC	CAC	GGG	AAG	AGC	CCG	GGC	AAG	AGA	GGG	CAC	ACG	AGC	GTC	GAG
Pro	Gly	His	Gly	Lys	Ser	Pro	Gly	Lys	Arg	Gly	His	Thr	Ser	Val	Glu
GAG	GCG	ATG	GAA	ATC	ATC	GAC	TCG	ATA	ATC	GAG	GAG	ATC	AGG	GAG	AAG
Glu	Ala	Met	Glu	Ile	Ile	Asp	Ser	Ile	Ile	Glu	Glu	Ile	Arg	Glu	Lys
CCC	TTC	CTC	TTC	GGC	CAC	AGC	CTC	GGT	GGT	CTA	ACT	GTC	ATC	AGG	TAC
Pro	Phe	Leu	Phe	Gly	His	Ser	Leu	Gly	Gly	Leu	Thr	Val	Ile	Arg	Tyr
GCT	GAG	ACG	CGG	CCC	GAT	AAA	ATA	CGG	GGA	TTA	ATA	GCT	TCC	TCG	CCT
Ala	Glu	Thr	Arg	Pro	Asp	Lys	Ile	Arg	Gly	Leu	Ile	Ala	Ser	Ser	Pro
GCC	CTC	GCC	AAG	AGC	CCG	GAA	ACG	CCG	GGC	TTC	ATG	GTG	GCC	CTC	GCG
Ala	Leu	Ala	Lys	Ser	Pro	Glu	Thr	Pro	Gly	Phe	Met	Val	Ala	Leu	Ala
AAG	TTC	CTT	GGA	AAG	ATC	GCC	CCG	GGA	GTT	GTT	CTC	TCC	AAC	GGC	ATA
Lys	Phe	Leu	Gly	Lys	Ile	Ala	Pro	Gly	Val	Val	Leu	Ser	Asn	Gly	Ile
AAG	CCG	GAA	CTC	CTC	TCG	AGG	AAC	AGG	GAC	GCC	GTG	AGG	AGG	TAC	GTT
Lys	Pro	Glu	Leu	Leu	Ser	Arg	Asn	Arg	Asp	Ala	Val	Arg	Arg	Tyr	Val
GAA	GAC	CCA	CTC	GTC	CAC	GAC	AGG	ATT	TCG	GCC	AAG	CTG	GGA	AGG	AGC
Glu	Asp	Pro	Leu	Val	His	Asp	Arg	Ile	Ser	Ala	Lys	Leu	Gly	Arg	Ser
ATC	TTC	GTG	AAC	ATG	GAG	CTG	GCC	CAC	AGG	GAG	GCG	GAC	AAG	ATA	AAA
Ile	Phe	Val	Asn	Met	Glu	Leu	Ala	His	Arg	Glu	Ala	Asp	Lys	Ile	Lys
GTC	CCG	ATC	CTC	CTT	CTG	ATC	GGC	ACT	GGC	GAT	GTA	ATA	ACC	CCG	CCT
Val	Pro	Ile	Leu	Leu	Leu	Ile	Gly	Thr	Gly	Asp	Val	Ile	Thr	Pro	Pro
GAA	GGC	TCA	CGC	AGA	CTC	TTC	GAG	GAG	CTG	GCC	GTC	GAG	AAC	AAA	ACC
Glu	Gly	Ser	Arg	Arg	Leu	Phe	Glu	Glu	Leu	Ala	Val	Glu	Asn	Lys	Thr
CTG	AGG	GAG	TTC	GAG	GGG	GCG	TAC	CAC	GAG	ATA	TTT	GAA	GAC	CCC	GAG
Leu	Arg	Glu	Phe	Glu	Gly	Ala	Tyr	His	Glu	Ile	Phe	Glu	Asp	Pro	Glu

Aquifex VF5-34LC

TTG	ATT	GGC	AAT	TTG	AAA	TTG	AAG	AGG	TTT	GAA	GAG	GTT	AAC	TTA	GTT
Leu	Ile	Gly	Asn	Leu	Lys	Leu	Lys	Arg	Phe	Glu	Glu	Val	Asn	Leu	Val
CTT	TCG	GGA	GGG	GCT	GCC	AAG	GGT	ATC	GCC	CAT	ATA	GGT	GTT	TTA	AAA
Leu	Ser	Gly	Gly	Ala	Ala	Lys	Gly	Ile	Ala	His	Ile	Gly	Val	Leu	Lys
GCT	CTG	GAA	GAG	CTC	GGT	ATA	AAG	GTA	AAG	AGG	CTC	AGC	GGG	GTA	AGT
Ala	Leu	Glu	Glu	Leu	Gly	Ile	Lys	Val	Lys	Arg	Leu	Ser	Gly	Val	Ser
GCT	GGA	GCT	ATC	GTT	TCC	GTC	TTT	TAC	GCT	TCG	GGC	TAC	ACT	CCC	GAC
Ala	Gly	Ala	Ile	Val	Ser	Val	Phe	Tyr	Ala	Ser	Gly	Tyr	Thr	Pro	Asp
GAG	ATG	TTA	AAA	CTC	CTG	AAA	GAG	GTA	AAC	TGG	CTC	AAA	CTT	TTT	AAG
Glu	Met	Leu	Lys	Leu	Leu	Lys	Glu	Val	Asn	Trp	Leu	Lys	Leu	Phe	Lys
TTC	AAA	ACA	CCG	AAA	ATG	GGC	TTA	ATG	GGG	TGG	GAG	AAG	GCT	GCA	GAG
Phe	Lys	Thr	Pro	Lys	Met	Gly	Leu	Met	Gly	Trp	Glu	Lys	Ala	Ala	Glu
TTT	TTG	GAA	AAA	GAG	CTC	GGA	GTT	AAG	AGG	CTG	GAA	GAC	CTG	AAC	ATA
Phe	Leu	Glu	Lys	Glu	Leu	Gly	Val	Lys	Arg	Leu	Glu	Asp	Leu	Asn	Ile
CCA	ACC	TAT	CTT	TGC	TCG	GCG	GAT	CTG	TAC	ACG	GGA	AAG	GCT	CTT	TAC
Pro	Thr	Tyr	Leu	Cys	Ser	Ala	Asp	Leu	Tyr	Thr	Gly	Lys	Ala	Leu	Tyr
TTC	GGC	AGA	GGT	GAC	TTA	ATT	CCC	GTG	CTT	CTC	GGA	AGT	TGT	TCC	ATA
Phe	Gly	Arg	Gly	Asp	Leu	Ile	Pro	Val	Leu	Leu	Gly	Ser	Cys	Ser	Ile
CCC	GGG	ATT	TTT	GAA	CCA	GTT	GAG	TAC	GAG	AAT	TTT	CTA	CTT	GTT	GAC
Pro	Gly	Ile	Phe	Glu	Pro	Val	Glu	Tyr	Glu	Asn	Phe	Leu	Leu	Val	Asp
GGA	GGT	ATA	GTG	AAC	AAC	CTG	CCC	GTA	GAA	CCT	TTG	GAA	AAG	TTC	AAA
Gly	Gly	Ile	Val	Asn	Asn	Leu	Pro	Val	Glu	Pro	Leu	Glu	Lys	Phe	Lys
GAA	CCC	ATA	ATC	GGG	GTA	GAT	GTG	CTT	CCC	ATA	ACT	CAA	GAA	AGA	AAG
Glu	Pro	Ile	Ile	Gly	Val	Asp	Val	Leu	Pro	Ile	Thr	Gln	Glu	Arg	Lys
ATT	AAA	AAT	ATA	CTC	CAC	ATC	CTT	ATA	AGG	AGC	TTC	TTT	CTG	GCG	GTT
Ile	Lys	Asn	Ile	Leu	His	Ile	Leu	Ile	Arg	Ser	Phe	Phe	Leu	Ala	Val
CGT	TCC	AAT	TCG	GAA	AAG	AGA	AAG	GAG	TTC	TGC	AAC	GTA	GTT	ATA	GAA
Arg	Ser	Asn	Ser	Glu	Lys	Arg	Lys	Glu	Phe	Cys	Asn	Val	Val	Ile	Glu
CCT	CCC	CTT	GAA	GAG	TTC	TCT	CCT	CTG	GAC	GTA	AAT	AAG	GCG	GAC	GAG
Pro	Pro	Leu	Glu	Glu	Phe	Ser	Pro	Leu	Asp	Val	Asn	Lys	Ala	Asp	Glu

ATA TTC TGC GGG GAT ATG AGA GCA CTT TAA
Ile Phe Cys Gly Asp Met Arg Ala Leu

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FIGURE 8

Teredinibacter - 42L

ATG	CCA	GCT	AAT	GAC	TCA	CCC	ACG	ATC	GAC	TTT	AAT	CCT	CGC	GGC	ATT
Met	Pro	Ala	Asn	Asp	Ser	Pro	Thr	Ile	Asp	Phe	Asn	Pro	Arg	Gly	Ile
CTT	CGC	AAC	GCT	CAC	GCA	CAG	GTT	ATT	TTA	GCG	ACT	TCC	GGC	TTG	CGC
Leu	Arg	Asn	Ala	His	Ala	Gln	Val	Ile	Leu	Ala	Thr	Ser	Gly	Leu	Arg
AAA	GCG	TTT	TTG	AAA	CGC	ACG	CAC	AAG	AGC	TAC	CTC	AGC	ACT	GCC	CAA
Lys	Ala	Phe	Leu	Lys	Arg	Thr	His	Lys	Ser	Tyr	Leu	Ser	Thr	Ala	Gln
TGG	CTG	GAG	CTC	GAT	GCC	GGC	AAC	GGA	GTT	ACC	TTG	GCC	GGA	GAG	CTT
Trp	Leu	Glu	Leu	Asp	Ala	Gly	Asn	Gly	Val	Thr	Leu	Ala	Gly	Glu	Leu
AAC	ACA	GCG	CCT	GCA	ACT	GCA	TCC	TCC	TCC	CAC	CCG	GCG	CAC	AAG	AAC
Asn	Thr	Ala	Pro	Ala	Thr	Ala	Ser	Ser	Ser	His	Pro	Ala	His	Lys	Asn
ACT	CTG	GTT	ATT	GTG	CTG	CAC	GGC	TGG	GAA	GGC	TCC	AGC	CAG	TCG	GCC
Thr	Leu	Val	Ile	Val	Leu	His	Gly	Trp	Glu	Gly	Ser	Ser	Gln	Ser	Ala
TAT	GCG	ACC	TCC	GCT	GGC	AGC	ACG	CTT	TTC	GAC	AAT	GGG	TTC	GAC	ACT
Tyr	Ala	Thr	Ser	Ala	Gly	Ser	Thr	Leu	Phe	Asp	Asn	Gly	Phe	Asp	Thr
TTT	CGC	CTT	AAT	TTT	CGC	GAT	CAC	GGC	GAC	ACC	TAC	CAC	TTA	AAC	CGC
Phe	Arg	Leu	Asn	Phe	Arg	Asp	His	Gly	Asp	Thr	Tyr	His	Leu	Asn	Arg
GGC	ATA	TTT	AAC	TCA	TCG	CTG	ATT	GAC	GAA	GTA	GTG	GGC	GCA	GTC	AAA
Gly	Ile	Phe	Asn	Ser	Ser	Leu	Ile	Asp	Glu	Val	Val	Gly	Ala	Val	Lys
GCC	ATC	CAG	CAG	CAA	ACC	GAC	TAC	GAC	AAG	TAT	TGC	CTG	ATG	GGG	TTC
Ala	Ile	Gln	Gln	Gln	Thr	Asp	Tyr	Asp	Lys	Tyr	Cys	Leu	Met	Gly	Phe
TCA	CTG	GGT	GGG	AAC	TTT	GCC	TTG	CGC	GTC	GCG	GTG	CGG	GAA	CAG	CAT
Ser	Leu	Gly	Gly	Asn	Phe	Ala	Leu	Arg	Val	Ala	Val	Arg	Glu	Gln	His
CTC	GCT	AAA	CCG	CTA	GCG	GGC	GTG	CTC	GCC	GTA	TGC	CCG	GTA	CTC	GAC
Leu	Ala	Lys	Pro	Leu	Ala	Gly	Val	Leu	Ala	Val	Cys	Pro	Val	Leu	Asp
CCC	GCA	CAC	ACC	ATG	ATG	GCC	CTA	AAC	CGA	GGT	GCG	TTT	TTC	TAC	GGC
Pro	Ala	His	Thr	Met	Met	Ala	Leu	Asn	Arg	Gly	Ala	Phe	Phe	Tyr	Gly
CGC	TAT	TTT	GCG	CAT	AAA	TGG	AAG	CGC	TCG	TTA	ACC	GCA	AAA	CTT	GCA
Arg	Tyr	Phe	Ala	His	Lys	Trp	Lys	Arg	Ser	Leu	Thr	Ala	Lys	Leu	Ala
GCT	TTC	CCA	GAC	TAC	AAA	TAC	GGC	AAA	GAT	TTA	AAA	TCG	ATA	CAC	ACG
Ala	Phe	Pro	Asp	Tyr	Lys	Tyr	Gly	Lys	Asp	Leu	Lys	Ser	Ile	His	Thr

FIGURE 9

Archeoglobus fulgidus VC16 - 16MC1

ATG CTT GAT ATG CCA ATC GAC CCT GTT TAC TAC CAG CTT GCT GAG TAT
 Met Leu Asp Met Pro Ile Asp Pro Val Tyr Tyr Gln Leu Ala Glu Tyr
 TTC GAC AGT CTG CCG AAG TTC GAC CAG TTT TCC TCG GCC AGA GAG TAC
 Phe Asp Ser Leu Pro Lys Phe Asp Gln Phe Ser Ser Ala Arg Glu Tyr
 AGG GAG GCG ATA AAT CGA ATA TAC GAG GAG AGA AAC CGG CAG CTG AGC
 Arg Glu Ala Ile Asn Arg Ile Tyr Glu Glu Arg Asn Arg Gln Leu Ser
 CAG CAT GAG AGG GTT GAA AGA GTT GAG GAC AGG ACG ATT AAG GGG AGG
 Gln His Glu Arg Val Glu Arg Val Glu Asp Arg Thr Ile Lys Gly Arg
 AAC GGA GAC ATC AGA GTC AGA GTT TAC CAG CAG AAG CCC GAT TCC CCG
 Asn Gly Asp Ile Arg Val Arg Val Tyr Gln Gln Lys Pro Asp Ser Pro
 GGT CTG GTT TAC TAT CAC GGT GGT GGA TTT GTG ATT TGC AGC ATC GAG
 Val Leu Val Tyr Tyr His Gly Gly Gly Phe Val Ile Cys Ser Ile Glu
 TCG CAC GAC GCC TTA TGC AGG AGA AYY GCG AGA CTT TCA AAC TCT ACC
 Ser His Asp Ala Leu Cys Arg Arg Ile Ala Arg Leu Ser Asn Ser Thr
 GTA GTC TCC GTG GAT TAC AGG CTC GCT CCT GAG CAC AAG TTT CCC CCC
 Val Val Ser Val Asp Tyr Arg Leu Ala Pro Glu His Lys Phe Pro Ala
 CCA GTT TAT CAT TGC TAC GAT GCG ACC AAG TGG GTT GCT GAG AAC CGG
 Ala Val Tyr Asp Cys Tyr Aso Ala Thr Lys Trp Val Ala Glu Asn Ala
 GAG GAG CTG AGG ATT GAC CCG TCA AAA ATC TTC GTT GGG GGG GAC AGT
 Glu Glu Leu Arg Ile Asp Pro Ser Lys Ile Phe Val Gly Gly Asp Ser
 GCG GGA CGG AAT CTT GCC CCG GCG CTT TCA ATA ATG GCG AGA GAC AGC
 Ala Gly Gly Asn Leu Ala Ala Ala Val Ser Ile Met Ala Arg Asp Ser
 GGA GAA GAT TTC ATA AAG CAT CAA ATT CTA ACT TAC CCC GTT GTG AAC
 Gly Glu Asp Phe Ile Lys His Gln Ile Leu Ile Tyr Pro Val Val Asn
 TTT GTA GCC CCC ACA CCA TCG CTT CTG GAG TTT GGA GAG GGG CTG TGG
 Phe Val Ala Pro Thr Pro Ser Leu Leu Glu Phe Gly Glu Gly Leu Trp
 ATT CTC GAC CAG AAG ATA ATG AGT TGG TTC TCG GAG CAG TAC TTC TCC
 Ile Leu Asp Gln Lys Ile Met Ser Trp Phe Ser Glu Gln Tyr Phe Ser
 AGA GAG GAA GAT AAG TTC AAG CCC CTC GCC TCC GTA ATC TTT GCG GAC
 Arg Glu Glu Aso Lys Phe Asn Pro Leu Ala Ser Val Ile Phe Ala Asp

FIGURE 10

Sulfolobus Solfataricus P1 - 8LC1

ATG	CCC	CTA	GAT	CCT	AGA	ATT	AAA	AAG	TTA	CTA	GAA	TCA	GCT	CTT	ACT
Met	Pro	Leu	Asp	Pro	Arg	Ile	Lys	Lys	Leu	Leu	Glu	Ser	Ala	Leu	Thr
ATA	CCA	ATT	GGT	AAA	GCC	CCA	GTA	GAA	GAG	GTA	AGA	AAG	ATA	TTT	AGG
Ile	Pro	Ile	Gly	Lys	Ala	Pro	Val	Glu	Glu	Val	Arg	Lys	Ile	Phe	Arg
CAA	TTA	GCG	TCG	GCA	GCT	CCC	AAA	GTC	GAA	GTT	GGA	AAA	GTA	GAA	GAT
Gln	Leu	Ala	Ser	Ala	Ala	Pro	Lys	Val	Glu	Val	Gly	Lys	Val	Glu	Asp
ATA	AAA	ATA	CCA	GGC	AGT	GAA	ACC	GTT	ATA	AAC	GCT	AGA	GTG	TAT	TTT
Ile	Lys	Ile	Pro	Gly	Ser	Glu	Thr	Val	Ile	Asn	Ala	Arg	Val	Tyr	Phe
CCG	AAG	AGT	AGC	GGT	CCT	TAT	GGT	GTT	CTA	GTG	TAT	CTT	CAT	GGA	GGC
Pro	Lys	Ser	Ser	Gly	Pro	Tyr	Gly	Val	Leu	Val	Tyr	Leu	His	Gly	Gly
GGT	TTT	GTA	ATA	GGC	GAT	GTG	GAA	TCT	TAT	GAC	CCA	TTA	TGT	AGA	GCA
Gly	Phe	Val	Ile	Gly	Asp	Val	Glu	Ser	Tyr	Asp	Pro	Leu	Cys	Arg	Ala
ATT	ACA	AAT	GCG	TGC	AAT	TGC	GTT	GTA	GTA	TCA	GTG	GAC	TAT	AGG	TTA
Ile	Thr	Asn	Ala	Cys	Asn	Cys	Val	Val	Val	Ser	Val	Asp	Tyr	Arg	Leu
GCT	CCA	GAA	TAC	AAG	TTT	CCT	TCT	GCA	GTT	ATC	GAT	TCA	TTT	GAC	GCT
Ala	Pro	Glu	Tyr	Lys	Phe	Pro	Ser	Ala	Val	Ile	Asp	Ser	Phe	Asp	Ala
ACT	AAT	TGG	GTT	TAT	AAC	AAT	TTA	GAT	AAA	TTT	GAT	GGA	AAG	ATG	GGA
Thr	Asn	Trp	Val	Tyr	Asn	Asn	Leu	Asp	Lys	Phe	Asp	Gly	Lys	Met	Gly
GTT	GCG	ATT	GCG	GGA	GAT	AGT	GCT	GGA	GGA	AAT	TTG	GCA	GCG	GTT	GTA
Val	Ala	Ile	Ala	Gly	Asp	Ser	Ala	Gly	Gly	Asn	Leu	Ala	Ala	Val	Val
GCT	CTT	CTT	TCA	AAG	GGT	AAA	ATT	AAT	TTG	AAG	TAT	CAA	ATA	CTG	GTT
Ala	Leu	Leu	Ser	Lys	Gly	Lys	Ile	Asn	Leu	Lys	Tyr	Gln	Ile	Leu	Val
TAC	CCA	GCG	GTA	AGT	TTA	GAT	AAC	GTT	TCA	AGA	TCC	ATG	ATA	GAG	TAC
Tyr	Pro	Ala	Val	Ser	Leu	Asp	Asn	Val	Ser	Arg	Ser	Met	Ile	Glu	Tyr
TCT	GAT	GGG	TTC	TTC	CTT	ACC	AGA	GAG	CAT	ATA	GAG	TGG	TTC	GGT	TCT
Ser	Asp	Gly	Phe	Phe	Leu	Thr	Arg	Glu	His	Ile	Glu	Trp	Phe	Gly	Ser
CAA	TAC	TTA	CGA	AGC	CCT	GCA	GAT	TTG	CTA	GAC	TTT	AGG	TTC	TCT	CCA
Gln	Tyr	Leu	Arg	Ser	Pro	Ala	Asp	Leu	Leu	Asp	Phe	Arg	Phe	Ser	Pro

60133-21222222

ATT CTG GCG CAA GAT TTC AAC GGA TTA CCT CCA GCC TTG ATA ATA ACA
Ile Leu Ala Gln Asp Phe Asn Gly Leu Pro Pro Ala Leu Ile Ile Thr

GCA GAA TAC GAT CCA CTA AGG GAT CAA GGA GAA GCG TAT GCA AAT AAA
Ala Glu Tyr Asp Pro Leu Arg Asp Gln Gly Glu Ala Tyr Ala Asn Lys

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CTA CTA CAA GCT GGA GTC TCA GTT ACT AGT GTG AGA TTT AAC AAC GTT
Leu Leu Gln Ala Gly Val Ser Val Thr Ser Val Arg Phe Asn Asn Val

ATA CAC GGA TTC CTC TCA TTC TTT CCG TTG ATG GAG CAA GGA AGA GAT
Ile His Gly Phe Leu Ser Phe Phe Pro Leu Met Glu Gln Gly Arg Asp

GCT ATA GGT CTG ATA GGG TCT GTG TTA AGA CGA GTA TTT TAT GAT AAA
Ala Ile Gly Leu Ile Gly Ser Val Leu Arg Arg Val Phe Tyr Asp Lys

ATT TAA
Ile

604230-242222

Figure 11
LA11.1 Esterase es2

ATG	AAG	GTT	AAA	CAC	GTT	ATT	GTT	TTA	CAT	GGC	TTA	TAT	ATG	TCT	GGC
Met	Lys	Val	Lys	His	Val	Ile	Val	Leu	His	Gly	Leu	Tyr	Met	Ser	Gly
TTG	GTG	ATG	CGC	CCG	TTA	TGT	TCG	CGT	CTA	GAA	GAG	TCG	GGG	GTT	AAA
Leu	Val	Met	Arg	Pro	Leu	Cys	Ser	Arg	Leu	Glu	Glu	Ser	Gly	Val	Lys
GTT	TTA	AAC	TTA	ACC	TAC	AAT	ACT	CGA	GAC	CCT	AAT	CGA	GAT	GCT	ATT
Val	Leu	Asn	Leu	Thr	Tyr	Asn	Thr	Arg	Asp	Pro	Asn	Arg	Asp	Ala	Ile
TTT	ACG	CAA	ATA	GAT	GAG	TTT	ATT	AGC	AAT	GAG	CCT	TCT	GCT	TTA	GTG
Phe	Thr	Gln	Ile	Asp	Glu	Phe	Ile	Ser	Asn	Glu	Pro	Ser	Ala	Leu	Val
TGT	CAC	TCT	ATG	GGG	GGC	TTA	GTT	GCT	CGC	GCC	TAT	TTA	GAG	GCA	AAC
Cys	His	Ser	Met	Gly	Gly	Leu	Val	Ala	Arg	Ala	Tyr	Leu	Glu	Ala	Asn
TCA	GCG	CCA	AGT	CAT	CAT	GTT	GAA	AAG	GTA	ATC	ACC	TTA	GGA	ACG	CCA
Ser	Ala	Pro	Ser	His	His	Val	Glu	Lys	Val	Ile	Thr	Leu	Gly	Thr	Pro
CAT	ACT	GGC	AGC	CAT	ATT	GCT	GAA	AAA	ATG	CAG	CAA	AAA	GGG	TTC	GAG
His	Thr	Gly	Ser	His	Ile	Ala	Glu	Lys	Met	Gln	Gln	Lys	Gly	Phe	Glu
CTA	TTA	TTA	AAA	AAT	AGC	GTT	GAG	TTT	TTA	CTC	TCT	AAG	AAT	GGT	GAT
Leu	Leu	Leu	Lys	Asn	Ser	Val	Glu	Phe	Leu	Leu	Ser	Lys	Asn	Gly	Asp
TGG	CCT	TTT	AAA	GCC	AAG	CTA	TAT	AGC	ATT	GCC	GGC	GAC	TTA	CCG	ATT
Trp	Pro	Phe	Lys	Ala	Lys	Leu	Tyr	Ser	Ile	Ala	Gly	Asp	Leu	Pro	Ile
GGC	TTA	ATG	CCA	CTC	ATT	GTA	AAA	GGC	AGC	CGC	TCT	GAT	GGC	ACT	GTA
Gly	Leu	Met	Pro	Leu	Ile	Val	Lys	Gly	Ser	Arg	Ser	Asp	Gly	Thr	Val
TTG	CTA	GAT	GAA	ACC	AAG	CTA	AAG	GGT	ATG	GCT	GAA	CAC	AAG	GTG	TTT
Leu	Leu	Asp	Glu	Thr	Lys	Leu	Lys	Gly	Met	Ala	Glu	His	Lys	Val	Phe
CAT	TTA	AGC	CAT	ACA	AGT	ATG	ATT	TAC	TCT	CGC	CAA	GTC	GTT	AAT	TAT
His	Leu	Ser	His	Thr	Ser	Met	Ile	Tyr	Ser	Arg	Gln	Val	Val	Asn	Tyr
ATT	CTT	GAG	CGC	TTG	AAC	GAG	GAC	ATT	TA						
Ile	Leu	Glu	Arg	Leu	Asn	Glu	Asp	Ile							

Figure 12
Whale Mat Sample 11.801 Esterase es9

ATG ATA AAA AAC TTC GAC AGA GAA AAT TCT AGC TTA GTA CTG TCC GGT
 Met Ile Lys Asn Phe Asp Arg Glu Asn Ser Ser Leu Val Leu Ser Gly
 GGT GGT GCT CTG GGT ATT GCT CAC TTG GGT GTA CTG CAT GAC CTT GAA
 Gly Gly Ala Leu Gly Ile Ala His Leu Gly Val Leu His Asp Leu Glu
 AAA CAA AAT ATT GTA CCA AAT GAA ATT GTT GGT ACA AGT ATG GGT GGT
 Lys Gln Asn Ile Val Pro Asn Glu Ile Val Gly Thr Ser Met Gly Gly
 ATC ATT GGT GCA TCT ATG GCT ATC GGG ATG AAA GAG AAA GAA ATA CTC
 Ile Ile Gly Ala Ser Met Ala Ile Gly Met Lys Glu Lys Glu Ile Leu
 GAA GAA ATC AAA AAC TTT TCC AAT GTC TTC AAC TGG ATA AAA TTC TCT
 Glu Glu Ile Lys Asn Phe Ser Asn Val Phe Asn Trp Ile Lys Phe Ser
 TTT TCC GGT AAT TCT GTT GTC GAT AAC GAG AAG ATC GCT AAG ATA TTT
 Phe Ser Gly Asn Ser Val Val Asp Asn Glu Lys Ile Ala Lys Ile Phe
 GAT ACT CTT TTT AAA GAC AGA AAG ATG ACA GAT ACG GTG ATC CCT CTT
 Asp Thr Leu Phe Lys Asp Arg Lys Met Thr Asp Thr Val Ile Pro Leu
 AAA CTC ATC GCT ACA AAC TTA CAT AAT GGA CAT AAA AAA GTA TTT ACT
 Lys Leu Ile Ala Thr Asn Leu His Asn Gly His Lys Lys Val Phe Thr
 GCT TCG GAT GAT GTA CTG ATC AAA GAT GCA ATA CTC TCA ACA ATG GCA
 Ala Ser Asp Asp Val Leu Ile Lys Asp Ala Ile Leu Ser Thr Met Ala
 ATA CCC GGT GTA TTT GAA GAA CAT ATT ATT GAT GGT GAA ACC TAT GGC
 Ile Pro Gly Val Phe Glu Glu His Ile Ile Asp Gly Glu Thr Tyr Gly
 GAC GGT TTT CTT TGT GAA AAC CTT GGT GTG AAT GAG GCA ACA TTC AAT
 Asp Gly Phe Leu Cys Glu Asn Leu Gly Val Asn Glu Ala Thr Phe Asn
 GAT GTT TTA GCT GTA GAT GTC ATG GGT GAG AAC TCT TTT GAA AAA GCA
 Asp Val Leu Ala Val Asp Val Met Gly Glu Asn Ser Phe Glu Lys Ala
 ATG CCG GAC AAC TTC TTT AAA ACA TCA AAT GTT TTA GAA ATG TTT GAA
 Met Pro Asp Asn Phe Phe Lys Thr Ser Asn Val Leu Glu Met Phe Glu
 AAA TCA ATG CGA CTT TTT ATT TAC AAC CAG ACA CAG ACA CAT ATT AAA
 Lys Ser Met Arg Leu Phe Ile Tyr Asn Gln Thr Gln Thr His Ile Lys
 AAT GCA AAT AAA AAT ATT TAT CTT ATT GAA CCC GTT ACC AAA GAG TAT
 Asn Ala Asn Lys Asn Ile Tyr Leu Ile Glu Pro Val Thr Lys Glu Tyr
 AAA ACA TTT CAA TTT CAT AAA CAT AAA GAG ATA CGT GCT TTA GGC TTG
 Lys Thr Phe Gln Phe His Lys His Lys Glu Ile Arg Ala Leu Gly Leu
 GGT TTA CTG TG
 Gly Leu Leu

Figure 13
Metallosphaera Prunae Ron 12/2 Esterase 23mc1

ATG	CCC	CTA	CAT	CCA	AAG	GTA	AAG	AAA	TTA	CTT	TCC	CAG	CTA	CCT	CCC
Met	Pro	Leu	His	Pro	Lys	Val	Lys	Lys	Leu	Leu	Ser	Gln	Leu	Pro	Pro
CAG	GAC	TTC	TCC	AGA	AAC	GTG	CAG	GAC	CTG	AGG	AAG	GCC	TGG	GAT	TTA
Gln	Asp	Phe	Ser	Arg	Asn	Val	Gln	Asp	Leu	Arg	Lys	Ala	Trp	Asp	Leu
CCC	TTC	TCA	GGG	AGG	AGG	GAG	ACC	CTG	AAG	AGG	GTT	GAG	GAC	CTT	GAG
Pro	Phe	Ser	Gly	Arg	Arg	Glu	Thr	Leu	Lys	Arg	Val	Glu	Asp	Leu	Glu
ATA	CCC	ACT	AGG	GAC	GCA	CGA	ATC	AGG	GCC	AGG	GTC	TAC	ACC	CCC	TCA
Ile	Pro	Thr	Arg	Asp	Ala	Arg	Ile	Arg	Ala	Arg	Val	Tyr	Thr	Pro	Ser
AGT	AAG	GAA	AAC	TTA	CCC	GTC	CTT	GTT	TAC	TAT	CAC	GGC	GGT	GGC	TTC
Ser	Lys	Glu	Asn	Leu	Pro	Val	Leu	Val	Tyr	Tyr	His	Gly	Gly	Gly	Phe
GTG	TTC	GGT	AGC	GTT	GAC	AGC	TAC	GAC	GGC	CTC	GCA	TCC	CTT	ATT	GCC
Val	Phe	Gly	Ser	Val	Asp	Ser	Tyr	Asp	Gly	Leu	Ala	Ser	Leu	Ile	Ala
AAG	GAA	TCT	GGG	ATT	GCG	GTT	ATC	TCC	GTG	GAG	TAT	AGG	CTC	GCC	CCT
Lys	Glu	Ser	Gly	Ile	Ala	Val	Ile	Ser	Val	Glu	Tyr	Arg	Leu	Ala	Pro
GAG	CAC	AAG	TTC	CCC	ACC	GCA	GTC	AAC	GAC	TCG	TGG	GAT	GCG	CTT	CTC
Glu	His	Lys	Phe	Pro	Thr	Ala	Val	Asn	Asp	Ser	Trp	Asp	Ala	Leu	Leu
TGG	ATC	GCG	GAG	AAC	GGA	GGC	AAG	CTG	GGG	CTC	GAC	ACC	TCG	AGA	CTT
Trp	Ile	Ala	Glu	Asn	Gly	Gly	Lys	Leu	Gly	Leu	Asp	Thr	Ser	Arg	Leu
GCC	GTG	GCT	GGG	GAT	AGT	GCT	GGA	GGA	AAC	CTG	TCT	GCC	GTG	GTG	TCC
Ala	Val	Ala	Gly	Asp	Ser	Ala	Gly	Gly	Asn	Leu	Ser	Ala	Val	Val	Ser
CTC	CTG	GAC	AGG	GAC	CAG	GGT	AAG	GGA	CTG	GTT	AGT	TAT	CAG	GTC	CTA
Leu	Leu	Asp	Arg	Asp	Gln	Gly	Lys	Gly	Leu	Val	Ser	Tyr	Gln	Val	Leu
ATC	TAC	CCA	GCA	GTG	AAC	ATG	GTC	GAT	AAC	TCC	CCA	TCC	GTC	AGG	GAG
Ile	Tyr	Pro	Ala	Val	Asn	Met	Val	Asp	Asn	Ser	Pro	Ser	Val	Arg	Glu
TAC	GGC	GAG	GGA	TAC	TTC	CTC	ACC	AGG	TCC	ATG	ATG	AAC	TGG	TTC	GGG
Tyr	Gly	Glu	Gly	Tyr	Phe	Leu	Thr	Arg	Ser	Met	Met	Asn	Trp	Phe	Gly
ACC	ATG	TAC	TTC	TCC	TCT	GGA	AGG	GAA	GCG	GTA	TCC	CCC	TAC	GCC	TCT
Thr	Met	Tyr	Phe	Ser	Ser	Gly	Arg	Glu	Ala	Val	Ser	Pro	Tyr	Ala	Ser
CCA	GCC	TTG	GCT	GAC	CTA	CAT	AAC	CTC	CCA	CCC	TCA	CTG	GTG	ATC	ACT
Pro	Ala	Leu	Ala	Asp	Leu	His	Asn	Leu	Pro	Pro	Ser	Leu	Val	Ile	Thr
GCA	GAG	TAT	GAT	CCC	CTA	AGG	GAT	CAG	GGA	GAG	ACC	TAC	TCT	CAC	TCC
Ala	Glu	Tyr	Asp	Pro	Leu	Arg	Asp	Gln	Gly	Glu	Thr	Tyr	Ser	His	Ser

CTA	AAC	GAG	GCT	GGA	AAC	GTA	TCA	ACC	TTG	GTT	AGA	TAT	CAA	GGA	ATG
Leu	Asn	Glu	Ala	Gly	Asn	Val	Ser	Thr	Leu	Val	Arg	Tyr	Gln	Gly	Met
ATT	CAC	GGC	TTC	CTG	TCC	TTC	TAC	GAG	TGG	ATA	ACT	GCC	GGT	AAA	CTA
Ile	His	Gly	Phe	Leu	Ser	Phe	Tyr	Glu	Trp	Ile	Thr	Ala	Gly	Lys	Leu
GCC	ATT	CAC	CAC	ATT	GCT	GGG	GTT	CTG	AGA	TCT	GTC	CTT	TA		
Ala	Ile	His	His	Ile	Ala	Gly	Val	Leu	Arg	Ser	Val	Leu			

Figure 14
Thermotoga neapolitana 5068 Esterase 56mc4

GTG GCC TTC TTC GAT ATG CCC CTT GAG GAA CTG AAA AAG TAC CGG CCT
 Val Ala Phe Phe Asp Met Pro Leu Glu Glu Leu Lys Lys Tyr Arg Pro
 GAA AGG TAC GAG GAG AAA GAT TTC GAT GAG TTC TGG AGG GAA ACA CTT
 Glu Arg Tyr Glu Glu Lys Asp Phe Asp Glu Phe Trp Arg Glu Thr Leu
 AAA GAA AGC GAA GGA TTC CCT CTG GAT CCC GTC TTT GAA AAG GTG GAC
 Lys Glu Ser Glu Gly Phe Pro Leu Asp Pro Val Phe Glu Lys Val Asp
 TTT CAT CTC AAA ACG GTT GAA ACG TAC GAT GTT ACT TTC TCT GGA TAC
 Phe His Leu Lys Thr Val Glu Thr Tyr Asp Val Thr Phe Ser Gly Tyr
 AGG GGG CAG AGA ATA AAG GGC TGG CTT CTT GTT CCG AAG TTG GCG GAA
 Arg Gly Gln Arg Ile Lys Gly Trp Leu Leu Val Pro Lys Leu Ala Glu
 GAA AAG CTT CCA TGC GTC GTG CAG TAC ATA GGT TAC AAT GGT GGA AGG
 Glu Lys Leu Pro Cys Val Val Gln Tyr Ile Gly Tyr Asn Gly Gly Arg
 GGT TTT CCA CAC GAC TGG CTG TTC TGG CCG TCA ATG GGT TAC ATC TGT
 Gly Phe Pro His Asp Trp Leu Phe Trp Pro Ser Met Gly Tyr Ile Cys
 TTT GTC ATG GAC ACC AGG GGG CAG GGA AGC GGC TGG ATG AAG GGA GAC
 Phe Val Met Asp Thr Arg Gly Gln Gly Ser Gly Trp Met Lys Gly Asp
 ACA CCG GAT TAC CCT GAG GGT CCA GTC GAT CCA CAG TAC CCC GGA TTC
 Thr Pro Asp Tyr Pro Glu Gly Pro Val Asp Pro Gln Tyr Pro Gly Phe
 ATG ACG AGG GGC ATT CTG GAT CCG GGA ACC TAT TAC TAC AGG CGA GTC
 Met Thr Arg Gly Ile Leu Asp Pro Gly Thr Tyr Tyr Tyr Arg Arg Val
 TTC GTG GAT GCG GTC AGG GCG GTG GAA GCA GCC ATT TCC TTC CCG AGA
 Phe Val Asp Ala Val Arg Ala Val Glu Ala Ala Ile Ser Phe Pro Arg
 GTG GAT TCC AGG AAG GTG GTG GTG GCC GGA GGC AGT CAG GGT GGG GGA
 Val Asp Ser Arg Lys Val Val Val Ala Gly Gly Ser Gln Gly Gly Gly
 ATC CCC CTT GCG GTG AGT GCC CTG TCG AAC AGG GTG AAG GCT CTG CTC
 Ile Pro Leu Ala Val Ser Ala Leu Ser Asn Arg Val Lys Ala Leu Leu
 TGC GAT GTG CCG TTT CTG TGC CAC TTC AGA AGG GCC GTG CAA CTT GTC
 Cys Asp Val Pro Phe Leu Cys His Phe Arg Arg Ala Val Gln Leu Val
 GAC ACA CAC CCA TAC GTG GAG ATC ACC AAC TTC CTC AAA ACC CAC AGG
 Asp Thr His Pro Tyr Val Glu Ile Thr Asn Phe Leu Lys Thr His Arg
 GAC AAA GAG GAG ATT GTT TTC AGA ACA CTT TCC TAC TTC GAT GGT GTG
 Asp Lys Glu Glu Ile Val Phe Arg Thr Leu Ser Tyr Phe Asp Gly Val

AAC TTT GCA GCA AGG GCA AAG GTG CCC GCC CTG TTT TCC GTT GGG CTC
 Asn Phe Ala Ala Arg Ala Lys Val Pro Ala Leu Phe Ser Val Gly Leu
 ATG GAC ACC ATC TGT CCT CCC TCG ACG GTC TTC GCC GCT TAC AAC CAC
 Met Asp Thr Ile Cys Pro Pro Ser Thr Val Phe Ala Ala Tyr Asn His
 TAC GCC GGT CCA AAG GAG ATC AGA ATC TAT CCG TAC AAC AAC CAC GAA
 Tyr Ala Gly Pro Lys Glu Ile Arg Ile Tyr Pro Tyr Asn Asn His Glu
 GGT GGA GGT TCT TTC CAG GCA ATT GAG CAG GTG AAA TTC TTG AAG AGA
 Gly Gly Gly Ser Phe Gln Ala Ile Glu Gln Val Lys Phe Leu Lys Arg
 CTA TTT GAG GAA GGC TAG

Figure 15
Melittangium lichenicola Esterase 77mc1

ATG CGC ACC CTC TCC TTC GGT CCG ATG ACC ACA GGG GGA AGC ATT CAC
Met Arg Thr Leu Ser Phe Gly Pro Met Thr Thr Gly Gly Ser Ile His
ATG GCG ACC ATG GAC GTG ATG CGC GGG CCG GGG ATG CAG CGG CTG TCA
Met Ala Thr Met Asp Val Met Arg Gly Pro Gly Met Gln Arg Leu Ser
CAG GGC GCC AGG GAG GCC GCG AAC CAC CCC TGG GCG AAG CGA CTG GGC
Gln Gly Ala Arg Glu Ala Ala Asn His Pro Trp Ala Lys Arg Leu Gly
CGC ATG GGC TAC GCG GCC AAG GGC GCC GTG TAC GCC ATC ATC GGC GTG
Arg Met Gly Tyr Ala Ala Lys Gly Ala Val Tyr Ala Ile Ile Gly Val
CTC GCG CTG AAG CTC GCG GCG GGC GAG GGC GGC CGG ACC ACG GAC AGC
Leu Ala Leu Lys Leu Ala Ala Gly Glu Gly Gly Arg Thr Thr Asp Ser
CAC GGC GCG GTG AAC ACC GTG GCG CAC GGG CCC TTC GGC GTC GCG CTG
His Gly Ala Val Asn Thr Val Ala His Gly Pro Phe Gly Val Ala Leu
CTG GCG GTG CTG GTG GTG GGC CTG CTG GGC TAC GTG GTC TGG AGG TTC
Leu Ala Val Leu Val Val Gly Leu Leu Gly Tyr Val Val Trp Arg Phe
GCC CAG GCC TTC GTG GAC ACG GAG GAC AAG GGC TCC GAC GCG AAG GGA
Ala Gln Ala Phe Val Asp Thr Glu Asp Lys Gly Ser Asp Ala Lys Gly
ATC GCC ACG CGC GCC ATG TAC TTC CTC AGC GGC TGC ATC TAC GCG TCG
Ile Ala Thr Arg Ala Met Tyr Phe Leu Ser Gly Cys Ile Tyr Ala Ser
CTG GCC TTC TTC GCC GCG CAG TCC CTG GTG GGC GCC GCG CAC GGC CGG
Leu Ala Phe Phe Ala Ala Gln Ser Leu Val Gly Ala Ala His Gly Arg
AGC AAG GGG ACG CAG GGC TGG ACG GCC ACG CTG ATG GAG CAG CCC TTT
Ser Lys Gly Thr Gln Gly Trp Thr Ala Thr Leu Met Glu Gln Pro Phe
GGC CGC GTG CTG GTG GCG CTG GTG GGC CTG GGC ATC GTG GGC TTC GCG
Gly Arg Val Leu Val Ala Leu Val Gly Leu Gly Ile Val Gly Phe Ala
CTG AAG CAG TTC CAC ACC GCG TGG AAG GCG AAG TTC CGG GAG AAG CTC
Leu Lys Gln Phe His Thr Ala Trp Lys Ala Lys Phe Arg Glu Lys Leu
ACC CTC ACC GGA CTG GCT GCC CGG AAG CAG CAC CAC ATC GAG CGC ATG
Thr Leu Thr Gly Leu Ala Ala Arg Lys Gln His His Ile Glu Arg Met
TGC CAG TTC GGC ATC GCC GCG GCG GGC GTG GTG TTC GCC GTC ATC GGC
Cys Gln Phe Gly Ile Ala Ala Arg Gly Val Val Phe Ala Val Ile Gly
GGC TTC CTC GTC CGC TCC GCC GTG GAC GCG AAC CCC GGC GAG GCC AAG
Gly Phe Leu Val Arg Ser Ala Val Asp Ala Asn Pro Gly Glu Ala Lys

GGC CTG GGA GAG GCC CTG GCC GTC GTC GCG AGG CAG CCG TCC GGC GAC
Gly Leu Gly Glu Ala Leu Ala Val Val Ala Arg Gln Pro Ser Gly Asp
GTG CTC CTG GGG GTG GTG GCG GCG GGC CTG GTG GCC TAC GCC GCC TAC
Val Leu Leu Gly Val Val Ala Ala Gly Leu Val Ala Tyr Ala Ala Tyr
CTG TTC CTC CAG GCG CGC TAC CGC GAA CTC TAG
Leu Phe Leu Gln Ala Arg Tyr Arg Glu Leu

Figure 16
Whale Mat Sample 11.801 Esterase es2

ATG	AGC	AAA	TTC	GCA	ATA	CTC	TGG	GCG	TTG	ATA	ACG	GCA	TAC	CTG	CCG
Met	Ser	Lys	Phe	Ala	Ile	Leu	Trp	Ala	Leu	Ile	Thr	Ala	Tyr	Leu	Pro
GAA	CCT	GTG	ATG	AAA	CTG	GTA	TAT	TTA	GGG	CGG	CGC	GAA	ACG	CTT	GGG
Glu	Pro	Val	Met	Lys	Leu	Val	Tyr	Leu	Gly	Arg	Arg	Glu	Thr	Leu	Gly
GCA	CGG	ACG	CTT	GAC	GTT	AAA	GCC	CAA	GCT	GTC	GGG	CGG	CTG	GCC	AAT
Ala	Arg	Thr	Leu	Asp	Val	Lys	Ala	Gln	Ala	Val	Gly	Arg	Leu	Ala	Asn
GCA	ACA	AGA	CCT	GTC	GGG	GTG	ATT	CCG	ACG	GTC	GAG	GAA	AGC	CGG	AAG
Ala	Thr	Arg	Pro	Val	Gly	Val	Ile	Pro	Thr	Val	Glu	Glu	Ser	Arg	Lys
ATG	ACG	GAT	AAA	GCC	GTT	AGC	CTT	TTT	GAT	CAG	CCC	GCC	CCC	GAA	TTA
Met	Thr	Asp	Lys	Ala	Val	Ser	Leu	Phe	Asp	Gln	Pro	Ala	Pro	Glu	Leu
TTC	CGT	AAA	AAA	GAC	ATT	CAG	ATT	GAC	GGG	GCT	GAA	GGG	CCT	ATT	GAT
Phe	Arg	Lys	Lys	Asp	Ile	Gln	Ile	Asp	Gly	Ala	Glu	Gly	Pro	Ile	Asp
GCC	CGT	ATT	TAC	AGC	GGC	CCT	GCA	AAA	CAT	CGC	CCR	CGR	CCA	ATW	CTA
Ala	Arg	Ile	Tyr	Ser	Gly	Pro	Ala	Lys	His	Arg	Pro	Arg	Pro	Ile	Leu
GTG	TAT	TTT	CAC	GGC	GGT	GGC	TGG	GTT	CAG	GGC	AAT	CTG	GAC	AGC	CAT
Val	Tyr	Phe	His	Gly	Gly	Gly	Trp	Val	Gln	Gly	Asn	Leu	Asp	Ser	His
GAC	GGG	GTT	TGC	GGC	AAG	CTG	GCA	AAA	TGG	GCG	AAC	TGC	ATT	GTT	ATC
Asp	Gly	Val	Cys	Gly	Lys	Leu	Ala	Lys	Trp	Ala	Asn	Cys	Ile	Val	Ile
TCG	GTC	GAT	TAT	CGT	CTA	GCG	CCC	GAA	CAC	AAA	TTT	CCT	TGT	GCG	CCG
Ser	Val	Asp	Tyr	Arg	Leu	Ala	Pro	Glu	His	Lys	Phe	Pro	Cys	Ala	Pro
CTT	GAT	GCG	ATT	GCG	GCC	TAT	AAA	TGG	GTG	CGC	GCC	AAC	GCA	ACA	AAC
Leu	Asp	Ala	Ile	Ala	Ala	Tyr	Lys	Trp	Val	Arg	Ala	Asn	Ala	Thr	Asn
CTT	GGC	GGC	GAT	CCT	GAA	CGT	ATC	GGC	GTT	GGC	GGC	GAT	AGC	GCA	GGG
Leu	Gly	Gly	Asp	Pro	Glu	Arg	Ile	Gly	Val	Gly	Gly	Asp	Ser	Ala	Gly
GGC	AAT	CTT	GCC	GCC	GTT	GTC	TGC	CAA	CAA	ACC	GCC	ATG	AAC	GGC	GAG
Gly	Asn	Leu	Ala	Ala	Val	Val	Cys	Gln	Gln	Thr	Ala	Met	Asn	Gly	Glu
CGC	ACA	CCA	GAT	CTG	CAA	GTC	CTG	ATC	TAT	CCG	GCG	CTG	GAT	GCA	CGC
Arg	Thr	Pro	Asp	Leu	Gln	Val	Leu	Ile	Tyr	Pro	Ala	Leu	Asp	Ala	Arg
ATG	ATC	TCG	ACC	TCG	ATG	GAG	GAA	TTG	CGT	GAT	GCC	TAC	ATC	TTG	CCG
Met	Ile	Ser	Thr	Ser	Met	Glu	Glu	Leu	Arg	Asp	Ala	Tyr	Ile	Leu	Pro
AAA	TCC	AGA	ATG	GAG	TAT	TTC	CTC	GGC	CTA	TAT	ACG	CGT	GGC	CCT	GAC
Lys	Ser	Arg	Met	Glu	Tyr	Phe	Leu	Gly	Leu	Tyr	Thr	Arg	Gly	Pro	Asp

GAT	ATC	GAG	GAC	CTT	AGG	ATG	TCG	CCA	ATT	CTC	AGG	GAT	ACC	GTC	GCG
Asp	Ile	Glu	Asp	Leu	Arg	Met	Ser	Pro	Ile	Leu	Arg	Asp	Thr	Val	Ala
GAT	CAA	CCC	CAA	GCC	TGC	ATT	GTC	ACC	TGT	GGG	TTT	GAC	CCT	GCG	CGA
Asp	Gln	Pro	Gln	Ala	Cys	Ile	Val	Thr	Cys	Gly	Phe	Asp	Pro	Ala	Arg
CGA	CGG	GAA	CAC	CTA	CGC	CGA	ACG	CTT	AAT	TGC	CGA	GGG	GAT	AGA	CGT
Arg	Arg	Glu	His	Leu	Arg	Arg	Thr	Leu	Asn	Cys	Arg	Gly	Asp	Arg	Arg

TA

Figure 17
Whale Mat Sample AD3059 Esterase es4

GTG AGC ATT CGT CTG CGA CTG TTA AAC TGG TTT TTG AAT ACC TTT GAA
Val Ser Ile Arg Leu Arg Leu Leu Asn Trp Phe Leu Asn Thr Phe Glu
AAA CCA AAA CTG GCC GCG GCC AAA ACG CCG GAT GAT TTG CGA AAA TCG
Lys Pro Lys Leu Ala Ala Ala Lys Thr Pro Asp Asp Leu Arg Lys Ser
TTT GAA TTA AAG GCG AGG TTT TTG TTT CCG GCG CCA CGT AAA ACA AGG
Phe Glu Leu Lys Ala Arg Phe Leu Phe Pro Ala Pro Arg Lys Thr Arg
TTT AGT CAT GAT GTA TTG CAG TCA GGC ATC GGG TCG GTA AAT GCC CAG
Phe Ser His Asp Val Leu Gln Ser Gly Ile Gly Ser Val Asn Ala Gln
TGG GCG AAA TCC AAA TCT GCA TCT GAT GAC AGG GTA ATC CTG TAT TTT
Trp Ala Lys Ser Lys Ser Ala Ser Asp Asp Arg Val Ile Leu Tyr Phe
CAT GGG GGA GGG TAT GTT TTT GGG TCA CCA AAA ACG CAC CGT GCA ATG
His Gly Gly Gly Tyr Val Phe Gly Ser Pro Lys Thr His Arg Ala Met
TTG GCG CGC TTG TCG GCA ATG ACA GGT CTT TCT GCG TGC CTT CCA GAT
Leu Ala Arg Leu Ser Ala Met Thr Gly Leu Ser Ala Cys Leu Pro Asp
TAT AGG TTG GCA CCA GAG CAC CCA TTT CCA GCC GCG ATC GAA GAT GCA
Tyr Arg Leu Ala Pro Glu His Pro Phe Pro Ala Ala Ile Glu Asp Ala
GTT TTA TCG TAT AAA TGT TTA CTA GAG CGA GCA ATC GAG CCC CAA AAT
Val Leu Ser Tyr Lys Cys Leu Leu Glu Arg Ala Ile Glu Pro Gln Asn
ATT ATA CTG GGG GGG GAC AGT GCT GGT GGC GGT TTG GTT CTT GCT TTG
Ile Ile Leu Gly Gly Asp Ser Ala Gly Gly Gly Leu Val Leu Ala Leu
CTT GCA GAA ATC AAG GCC CAA TCC TTG CCC AAA CCT GCT GGC GTT TTT
Leu Ala Glu Ile Lys Ala Gln Ser Leu Pro Lys Pro Ala Gly Val Phe
GCC TTG TCG CCT TTG GTT GAT TTA TCA TTT TCG GGC CTT TCG TTT TCT
Ala Leu Ser Pro Leu Val Asp Leu Ser Phe Ser Gly Leu Ser Phe Ser
AAA AAT GCC CAA ACC GAT GTG ATG TTG CCC GCA TCA CGG GCT GCG GAT
Lys Asn Ala Gln Thr Asp Val Met Leu Pro Ala Ser Arg Ala Ala Asp
ATG GCG ACC TTG TAT TTG GAT GGG GCC GAT GCA GAT GAT CCA CGT GCA
Met Ala Thr Leu Tyr Leu Asp Gly Ala Asp Ala Asp Asp Pro Arg Ala
TCG CCG CTG CAG GCG GAT TTT TCT GGC ATG CCG CCT GTA TTT CTG ACA
Ser Pro Leu Gln Ala Asp Phe Ser Gly Met Pro Pro Val Phe Leu Thr
GCA AGT GAC AGT GAA ATC CTG TTG GAT GAT TGC CTG CGG ATG GCG GAT
Ala Ser Asp Ser Glu Ile Leu Leu Asp Asp Cys Leu Arg Met Ala Asp

CAC TTG CGT GCG CAA GGT GTC GTT GTG ACA GAC CGG ATT GTT GAA AAC
His Leu Arg Ala Gln Gly Val Val Val Thr Asp Arg Ile Val Glu Asn

CAT CCA CAT GTT TGG CAT ATT TTT CAA CGC CTT CTA CCC GAA GCA GAT
His Pro His Val Trp His Ile Phe Gln Arg Leu Leu Pro Glu Ala Asp
CAG GGG CTG CGG GCG ATT GCC GCG TGG ATT AAA CCT CTT TTA TCA GGT
Gln Gly Leu Arg Ala Ile Ala Ala Trp Ile Lys Pro Leu Leu Ser Gly
TCA AAC GAA AGC TA
Ser Asn Glu Ser

Figure 18
Microscilla furvescens Esterase 53sc2

ATG	CTT	ACA	TTT	AAT	GTT	TTA	TAT	GGT	ATG	ATG	AAA	CAA	AAA	CTA	GCA
Met	Leu	Thr	Phe	Asn	Val	Leu	Tyr	Gly	Met	Met	Lys	Gln	Lys	Leu	Ala
GCA	ATT	CTC	ATG	TTT	TTA	GGG	CTA	TCA	GCA	GCA	GAG	GCT	CAA	GAC	TGG
Ala	Ile	Leu	Met	Phe	Leu	Gly	Leu	Ser	Ala	Ala	Glu	Ala	Gln	Asp	Trp
CCT	GAC	CTA	CAG	AAA	TAT	CGT	AGT	GCT	AAT	AAA	GAA	GCC	AAA	TTA	CTT
Pro	Asp	Leu	Gln	Lys	Tyr	Arg	Ser	Ala	Asn	Lys	Glu	Ala	Lys	Leu	Leu
CCA	AAG	GAA	AAC	CGG	AAG	GTG	GTT	TTT	ATG	GGC	AAC	TCC	ATT	ACA	GAA
Pro	Lys	Glu	Asn	Arg	Lys	Val	Val	Phe	Met	Gly	Asn	Ser	Ile	Thr	Glu
GCC	TGG	ATT	AGT	CAG	CGA	CCT	GAG	TTT	TTT	AGT	GAA	AAT	GGG	TTT	ATC
Ala	Trp	Ile	Ser	Gln	Arg	Pro	Glu	Phe	Phe	Ser	Glu	Asn	Gly	Phe	Ile
GGT	CGA	GGC	ATC	AGT	GGC	CAG	ACA	ACC	CCT	CAG	ATG	TTG	TTG	AGA	TTC
Gly	Arg	Gly	Ile	Ser	Gly	Gln	Thr	Thr	Pro	Gln	Met	Leu	Leu	Arg	Phe
CGA	CAG	GAT	GTG	ATA	GAC	CTG	CAG	CCA	AAG	GCT	GTA	GTG	ATA	CTA	GCT
Arg	Gln	Asp	Val	Ile	Asp	Leu	Gln	Pro	Lys	Ala	Val	Val	Ile	Leu	Ala
GGT	ACC	AAT	GAC	GTA	GCT	CAA	AAT	ACC	GGG	CCG	ATG	ACC	ATT	GAG	GAA
Gly	Thr	Asn	Asp	Val	Ala	Gln	Asn	Thr	Gly	Pro	Met	Thr	Ile	Glu	Glu
TCG	CTT	GCT	AAC	ATT	AAG	TCT	ATG	GTG	GAG	CTG	GCG	CAA	GCC	AAT	GGG
Ser	Leu	Ala	Asn	Ile	Lys	Ser	Met	Val	Glu	Leu	Ala	Gln	Ala	Asn	Gly
ATC	ACG	CCT	GTT	TTG	TGT	ACC	GTG	CTG	CCT	GCA	GAT	CGT	TTC	AGC	TGG
Ile	Thr	Pro	Val	Leu	Cys	Thr	Val	Leu	Pro	Ala	Asp	Arg	Phe	Ser	Trp
CGA	CCT	GAG	CTT	ACA	CCC	GCA	GAA	ACT	ATC	ATT	GCC	CTC	AAT	CAG	CTC
Arg	Pro	Glu	Leu	Thr	Pro	Ala	Glu	Thr	Ile	Ile	Ala	Leu	Asn	Gln	Leu
ATT	AAG	CAA	TAT	GCC	GAG	GCA	CAG	GGC	CTG	GCC	CTG	GTG	GAT	TAT	CAT
Ile	Lys	Gln	Tyr	Ala	Glu	Ala	Gln	Gly	Leu	Ala	Leu	Val	Asp	Tyr	His
GCT	GCA	CTC	ACC	AAT	AAA	GGT	GGA	GGA	CTT	CCG	GTG	AAA	TAC	GGA	GAA
Ala	Ala	Leu	Thr	Asn	Lys	Gly	Gly	Gly	Leu	Pro	Val	Lys	Tyr	Gly	Glu
GAT	GGT	GTG	CAT	CCA	AAT	GTA	GCA	GGC	TAT	CAG	GTG	ATG	GAA	AAC	ATT
Asp	Gly	Val	His	Pro	Asn	Val	Ala	Gly	Tyr	Gln	Val	Met	Glu	Asn	Ile
GTT	TTA	CCG	GTC	ATT	TCC	AGC	GAG	TTG	GCA	AAG	CTG	AAG	TA		
Val	Leu	Pro	Val	Ile	Ser	Ser	Glu	Leu	Ala	Lys	Leu	Lys			

Figure 19
Thermotoga maritima MSB8 Esterase 6scl

ATG GCC TTC TTC GAT TTA CCA CTC GAA GAA CTG AAG AAA TAT CGT CCA
Met Ala Phe Phe Asp Leu Pro Leu Glu Glu Leu Lys Lys Tyr Arg Pro
GAG CGG TAC GAA GAG AAA GAC TTC GAT GAG TTC TGG GAA GAG ACA CTC
Glu Arg Tyr Glu Glu Lys Asp Phe Asp Glu Phe Trp Glu Glu Thr Leu
GCA GAG AGC GAA AAG TTC CCC TTA GAC CCC GTC TTC GAG AGG ATG GAG
Ala Glu Ser Glu Lys Phe Pro Leu Asp Pro Val Phe Glu Arg Met Glu
TCT CAC CTC AAA ACA GTC GAA GCG TAC GAT GTC ACC TTC TCC GGA TAC
Ser His Leu Lys Thr Val Glu Ala Tyr Asp Val Thr Phe Ser Gly Tyr
AGG GGA CAG AGG ATC AAA GGG TGG CTC CTT GTT CCA AAA CTG GAA GAA
Arg Gly Gln Arg Ile Lys Gly Trp Leu Leu Val Pro Lys Leu Glu Glu
GAA AAA CTT CCC TGC GTT GTG CAG TAC ATA GGA TAC AAC GGT GGA AGA
Glu Lys Leu Pro Cys Val Val Gln Tyr Ile Gly Tyr Asn Gly Gly Arg
GGA TTC CCT CAC GAC TGG CTG TTC TGG CCT TCT ATG GGT TAC ATA TGT
Gly Phe Pro His Asp Trp Leu Phe Trp Pro Ser Met Gly Tyr Ile Cys
TTC GTC ATG GAT ACT CGA GGT CAG GGA AGC GGC TGG CTG AAA GGA GAC
Phe Val Met Asp Thr Arg Gly Gln Gly Ser Gly Trp Leu Lys Gly Asp
ACA CCG GAT TAC CCT GAG GGT CCC GTT GAC CCT CAG TAT CCA GGA TTC
Thr Pro Asp Tyr Pro Glu Gly Pro Val Asp Pro Gln Tyr Pro Gly Phe
ATG ACA AGA GGA ATA CTG GAT CCC AGA ACT TAC TAC TAC AGA CGA GTC
Met Thr Arg Gly Ile Leu Asp Pro Arg Thr Tyr Tyr Tyr Arg Arg Val
TTC ACG GAC GCT GTC AGA GCC GTT GAA GCT GCT GCT TCT TTT CCT CAG
Phe Thr Asp Ala Val Arg Ala Val Glu Ala Ala Ala Ser Phe Pro Gln
GTA GAT CAA GAA AGA ATC GTG ATA GCT GGA GGC AGT CAG GGT GGC GGA
Val Asp Gln Glu Arg Ile Val Ile Ala Gly Gly Ser Gln Gly Gly Gly
ATA GCC CTT GCG GTG AGC GCT CTC TCA AAG AAA GCA AAG GCT CTT CTG
Ile Ala Leu Ala Val Ser Ala Leu Ser Lys Lys Ala Lys Ala Leu Leu
TGC GAT GTG CCG TTT CTG TGT CAC TTC AGA AGA GCA GTA CAG CTT GTG
Cys Asp Val Pro Phe Leu Cys His Phe Arg Arg Ala Val Gln Leu Val
GAT ACG CAT CCA TAC GCG GAG ATC ACG AAC TTT CTA AAG ACC CAC AGA
Asp Thr His Pro Tyr Ala Glu Ile Thr Asn Phe Leu Lys Thr His Arg
GAC AAG GAA GAA ATC GTG TTC AGG ACT CTT TCC TAT TTC GAT GGA GTG
Asp Lys Glu Glu Ile Val Phe Arg Thr Leu Ser Tyr Phe Asp Gly Val

AAC TTC GCA GCC AGA GCG AAG ATC CCT GCG CTG TTT TCT GTG GGT CTC
Asn Phe Ala Ala Arg Ala Lys Ile Pro Ala Leu Phe Ser Val Gly Leu
ATG GAC AAC ATT TGT CCT CCT TCA ACG GTT TTC GCT GCC TAC AAT TAC
Met Asp Asn Ile Cys Pro Pro Ser Thr Val Phe Ala Ala Tyr Asn Tyr
TAC GCT GGA CCG AAG GAA ATC AGA ATC TAT CCG TAC AAC AAC CAC GAG
Tyr Ala Gly Pro Lys Glu Ile Arg Ile Tyr Pro Tyr Asn Asn His Glu
GGA GGA GGC TCT TTC CAA GCG GTT GAA CAG GTG AAA TTC TTG AAA AAA
Gly Gly Gly Ser Phe Gln Ala Val Glu Gln Val Lys Phe Leu Lys Lys
CTA TTT GAG AAA GGC TAA

Leu Phe Glu Lys Gly

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Figure 20
***Polyangium brachysporum* Esterase 78mcl**

TTG	AAG	TAC	TTC	AAA	GCC	CGG	CTT	GCC	GGC	ATC	ACC	TTG	CTC	GGC	CTG
Leu	Lys	Tyr	Phe	Lys	Ala	Arg	Leu	Ala	Gly	Ile	Thr	Leu	Leu	Gly	Leu
CTG	GCC	TGC	ACC	TCG	GCC	TCG	GCG	CAG	ACC	GAG	CCC	ATC	GTG	TTC	GTG
Leu	Ala	Cys	Thr	Ser	Ala	Ser	Ala	Gln	Thr	Glu	Pro	Ile	Val	Phe	Val
CAC	GGC	TAT	TCC	GGC	AGC	GCA	TCC	AAC	TGG	GAC	ACC	ATG	CTG	GGC	CGC
His	Gly	Tyr	Ser	Gly	Ser	Ala	Ser	Asn	Trp	Asp	Thr	Met	Leu	Gly	Arg
TTC	CGG	TCG	AAC	GGT	TAT	GCG	TCC	GGC	TCG	CTC	TAC	ACC	TTC	AAC	TAC
Phe	Arg	Ser	Asn	Gly	Tyr	Ala	Ser	Gly	Ser	Leu	Tyr	Thr	Phe	Asn	Tyr
AAC	TCG	TTG	GTC	AGC	AGC	AAC	CGC	ACC	AGC	GCC	AGC	GAG	CTG	CGC	AGC
Asn	Ser	Leu	Val	Ser	Ser	Asn	Arg	Thr	Ser	Ala	Ser	Glu	Leu	Arg	Ser
TTC	GTC	AAC	ACC	GTG	CGT	TCG	CGC	CAC	GGC	AAC	GCC	CGC	ATC	GCG	CTG
Phe	Val	Asn	Thr	Val	Arg	Ser	Arg	His	Gly	Asn	Ala	Arg	Ile	Ala	Leu
GTC	GCC	CAC	TCC	AAC	GGC	GGG	CTG	GTG	TCG	CGC	TGG	TAT	CGC	GCG	GAG
Val	Ala	His	Ser	Asn	Gly	Gly	Leu	Val	Ser	Arg	Trp	Tyr	Arg	Ala	Glu
CTG	GGC	GGC	GAA	ACG	GCC	ACC	CGC	CGC	TTC	GTG	ACG	CTG	GGC	ACG	CCG
Leu	Gly	Gly	Glu	Thr	Ala	Thr	Arg	Arg	Phe	Val	Thr	Leu	Gly	Thr	Pro
CAC	CGG	GGC	ACC	ACC	TGG	GCC	TAT	GCG	TGC	TAC	AGC	CCC	GCA	TGT	TTC
His	Arg	Gly	Thr	Thr	Trp	Ala	Tyr	Ala	Cys	Tyr	Ser	Pro	Ala	Cys	Phe
GAG	ATG	CGC	CCC	GGC	TCC	AGC	TTG	CTG	ACC	ACG	CTG	GGC	TCG	CGT	GCC
Glu	Met	Arg	Pro	Gly	Ser	Ser	Leu	Leu	Thr	Thr	Leu	Gly	Ser	Arg	Ala
TGC	GAC	CGC	TCG	CTG	TGG	TCG	AAC	ACC	GAC	GGC	ATC	ATC	CTG	CCG	GCG
Cys	Asp	Arg	Ser	Leu	Trp	Ser	Asn	Thr	Asp	Gly	Ile	Ile	Leu	Pro	Ala
TCC	AGC	GCG	CAG	TGT	GGT	GTC	AGC	ACG	CGC	ACT	GCC	GAC	GTC	AGC	CAT
Ser	Ser	Ala	Gln	Cys	Gly	Val	Ser	Thr	Arg	Thr	Ala	Asp	Val	Ser	His
CTC	GAC	CTG	CTG	ACC	GAC	TCT	CGC	GTG	TAC	ACG	CAG	TTG	CGC	ACG	CAG
Leu	Asp	Leu	Leu	Thr	Asp	Ser	Arg	Val	Tyr	Thr	Gln	Leu	Arg	Thr	Gln
TTG	CAA	TGA	GGG	TGA	CGG	TGC	ACC	GAA	CGT	GCA	CCT	G			
Leu	Gln	End	Gly	End	Arg	Cys	Thr	Glu	Arg	Ala	Pro				

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